

HTTP/2 server push + Browser cache

igrigorik@chromium.org

Current browser implementations:

1. **Edge:**
 - Initial flow control window is 10MB; no restriction on push.
 - Unclaimed push streams are not committed to HTTP cache until matched with request from the application (conceptually, push cache is “below” HTTP cache)
2. **Firefox:**
 - Initial flow control window on push streams is [64kb](#).
 - Unclaimed push streams are not committed to HTTP cache until they are matched with a request from the application.
3. **Chrome:**
 - No flow control restrictions on push streams, see crbug.com/313954.
 - Unclaimed push streams are not committed to HTTP cache until they are matched with a request from the application (see “Unclaimed pushed” column in chrome://net-internals/#http2)
4. **Safari:**
 - Push is disabled (via SETTINGS)

What happens when...

1. **The server pushes a resource (200) and there is a valid entry in browser’s cache?**
 - a. FF: sends RST_STREAM.
 - b. Chrome: sends RST_STREAM.
2. **The server pushes a revalidation (304) and...**
 - a. **There is no existing entry for such resource in browser’s cache?**
 - i. Expected: browser sends a RST_STREAM
 - ii. Implementation:
 1. FF: ...
 2. Chrome: accepts 304 and stores it with empty body (**bug**)
 - b. **There is an existing entry in browser’s cache that has expired?**
 - i. Expected:
 1. If ETag/Last-Modified is not available on cached or pushed request, send RST_STREAM.
 2. Check that ETag/Last-Modified matches and if so update headers and freshness lifetime, while retaining existing body. Otherwise RST_STREAM.
 - ii. FF: ...

- iii. Chrome: updates max-age, body is retained. (TODO: check ETag logic)

c. There is an existing entry in browser's cache that is still valid?

- i. Expected:
 - 1. Similar to (b): check ETag/Last-Modified and if valid then extend the cache lifetime with provided max-age?
- ii. FF: ...
- iii. Chrome: ...

5. The server pushes an invalidation ([410 Gone?](#)) and...

- **There is no such resource in client's cache?**
 - Expected: send RST_STREAM.
- **There is a valid resource in browser cache?**
 - Expected: browser bypasses HTTP cache when resource is requested by the application (it's not evicted immediately because push stream must be matched by request from client).
- Use case: the server wants to invalidate a resource that the client may have cached - e.g. the client has a long-lived asset that has a bug or security issue and server wants to purge it from client's cache.
 - This may not be that useful in practice because in order to push an invalidation the client must open an h2 connection to the origin (cross-origin push is not allowed)... And if you're a popular widget provider that served a long-expiry resource with no other dependencies, then no such connection will be made (resource is fetched from cache).

Questions, etc...

- 1. Other compelling server push use cases not covered here?
- 2. Is there implementation interest: UA's, developers?
 - a. If there is, should there be a spec for this?